



**VASQUEZ BOULEVARD/INTERSTATE 70 SITE  
WORKING GROUP MEETING**

**FINAL MEETING SUMMARY  
August 5, 1999  
Swansea Recreation Center, Denver, CO**

**IN ATTENDANCE**

**Working Group**

Michael Maes, Elyria Neighborhood  
Lorraine Granado, Swansea Neighborhood and Cross Community Coalition  
Jane Mitchell, State of Colorado Dept. of Public Health and Environment  
Barbara O'Grady, State of Colorado Dept. of Public Health and Environment  
Celia VanDerLoop, City and County of Denver, Dept. of Environmental Health  
Anthony Thomas, Clayton Neighborhood  
Sandy Douglas, Cole Neighborhood  
Chuck Patterson, Globeville Neighborhood  
Susan Muza, ATSDR  
Joan Hooker, Clayton Neighborhood  
Mel Munoz, COPEEN  
Chris Weis, EPA, Region 8  
Bonnie Lavelle, EPA, Region 8  
France Hartogh, State of Colorado Attorney General's Office  
Linda Larson, Heller Ehrman (Asarco)

**Others**

Ted Fellman, EPA Region 8  
Joyce Tsuji, Exponent (Asarco)  
Nancy Strauss, State of Colorado Dept. of Public Health and Environment  
Marion Galant, State of Colorado Dept. of Public Health and Environment  
Pat Courtney, EPA, Region 8  
Mike Wenstrom, EPA, Region 8  
Dave Folkes, EnviroGroup (Asarco)  
Mark Rudolph, State of Colorado, Dept. of Public Health and Environment

**Facilitators**

Mary Margaret Golten  
Tamara Sadoo (notetaker)

## **UPDATES**

Bonnie Lavelle reviewed the status of the key studies within the Superfund Process for the Vasquez Boulevard/I70 site. The EPA is now working on the risk assessment phase of the study. Bonnie also noted that comments from others in the Working Group on the numerous studies throughout this process have increased.

The State pointed out that once EPA received comments, there was no more communication with the Working Group about how EPA made final decisions. The community requested that everyone in the Working Group be able to see everyone else's comments, along with the responses. Having this information would allow the community representatives to better inform their constituencies.

The EPA suggested that either a smaller meeting could be scheduled to demonstrate how final decisions are made or an interim final document could be circulated to the Working Group.

### **Pax, the State and EPA's Standard Operating Procedure**

EPA is in the process of revising its Standard Operating Procedure (SOP), at the request of the State to include examination of metals other than lead (Pb) and arsenic (As) using microprobe analysis. The new SOP will include analysis of Pax as well metals such as antimony, indium, thallium, mercury, and selenium. An SOP is required for any scientific study to be defensible. The EPA will contact Dr. John Drexler to discuss a time frame for the revised SOP to be complete.

Lorraine Granado expressed the community's concern over the Phase One SOP. She stated that the community would like to see more intensive sampling in Phase Three.

The EPA will try to send a portion of the Pax sample they received under CERCLA to the State. The State is scheduled to go to Alternative Dispute Resolution (ADR) with Asarco in October. Under the Globe Consent Decree, areas around the Globe smelter are to be cleaned block-by-block until a "clean" block is reached. A clean block has not yet been found. The consent decree allows Asarco to attempt to demonstrate that metals found in the area are due to other sources. Asarco submitted a report on the Pax issue; the state did not find the Asarco study to be persuasive. The State, however, would like to conduct a separate analysis of Pax for verification.

EPA is remaining cautious about results from the Pax sample analysis. The Pax sample EPA acquired was out of "chain of custody" for a period of time. Numerous factors, such as air and water, may have affected the sample in a variety of ways, possibly altering the Pax.

## **NPL Listing**

Vasquez Boulevard and I/70 was added to the National Priorities List of Superfund sites on July 22<sup>nd</sup>, 1999. The boundaries for the site were determined by identifying lead and arsenic in a certain number of samples collected in Phases One and Two. If certain samples were found to have amounts of lead and arsenic sufficiently above background levels, an outline was drawn connecting areas where those samples were found. Lead and arsenic were the only two metals tested for listing. The amount found indicated that there was a release. Now, the analyzing and risk assessment will include all metals found at the site. Page 12 of the Hazard Ranking System (HRS) Documentation Record contains a map of the listed area.

Maps, the HRS document, and summary of how the HRS works will be made available to all Working Group members and to certain repositories and libraries throughout the communities involved.

Lorraine Granado requested that the determination of background levels for this site be made available to the Working Group. She expressed concern that heavily industrialized areas such as Vasquez/I70 usually receive higher background levels than non-industrialized areas. Vasquez/I70 should not be given higher background levels. She also feels that Environmental Justice (EJ) issues would play a role in making this determination.

## **Community Involvement**

Ted Fellman reported that Superfund listing of the Vasquez/I70 site received television and radio coverage. Interest in the sampling efforts has been expressed as well. One TV station would like to do a story and there is a Swansea resident willing to participate. EPA crews are knocking on all residents' doors once, in both Spanish and English, except for homes where the EPA has received signed access agreements. Flyers explaining lead and arsenic exposure, health effects etc., along with EPA telephone numbers are left behind if there is no one home when crews visit.

Access has been granted to the EPA from 1000-1200 community residents. Lorraine Granado noted that the community is responding positively to the current sampling process. Sandy Douglas suggested that crews also attempt to contact residents on Saturdays when many people are home. Ted Fellman requested that comments on the new draft fact sheet be made and sent to him as soon as possible. The fact sheet includes tentative dates for open houses. The risk assessment fact sheet is scheduled for release in September.

## **Phase Three Sampling**

Due to technical concerns with the X-Ray Fluorescence (XRF) machine to be used in Phase Three sampling, the EPA commenced Phase Three sampling on Wednesday, August 4<sup>th</sup>, 1999, 8 days after the planned start date of July 26<sup>th</sup>, 1999. Sampling will

begin simultaneously throughout the communities. The lab containing the XRF machine doing the analyses will be housed in a trailer in the neighborhood.

Anthony Thomas asked when and if yards tested during Phase One would be re-tested, and how hot spots would be addressed. Bonnie Lavelle and Chris Weis explained that Phases One and Two will be re-examined scientifically, looking at the theory behind the sampling design, the statistics, and number crunches, how the sampling was implemented, whether 2" and 4" sampling was appropriate, and whether the samples were handled properly. Once this information is obtained, the EPA will be able to determine which areas and yards need to be re-sampled. Phases One and Two will now utilize the same standards being set for Phase Three.

### **Technical Meetings**

The EPA, along with other agencies and Working Group members were not comfortable with the sampling plans' ability to catch hot spots. Sampling consisted of collecting ten samples, three times from each yard. A composite was made of each of those ten samples, and a decision regarding lead and arsenic levels was made based on an average taken from the composite sample. The worst-case scenario is that a hot spot exists on a property where the rest of the property is clean, potentially allowing for dilution when the samples are composited, such that the analysis would not detect the hot spot. The EPA, with their contractor, therefore, re-examined the definition of a hot spot along with whether they had confidence the sampling plan identifies hot spots.

Toxicologists were also concerned about the possibility of a child coming into contact with a hot spot and either receiving one big exposure or getting exposed in a larger area frequently over a period of time. Calculations were made to determine screening levels that may indicate further sampling is needed.

The resulting values established a baseline, or a safety level, which other results would be compared to. Results above the baseline value would be re-examined by the EPA. Results below the safety level would be considered safe. A computer simulation combined one hot sample with nine background level samples.

Numerous different computer simulations were carried out placing hot spots in various areas throughout a yard with one hot sample out of the total of ten. For every condition tested, it was impossible to pass the test for long-term exposure to yard average and fail short-term test. By revisiting the sampling design, the EPA is building confidence in their sampling plan. If a sampled yard fails the test or comes out above the safety levels, remediation will be considered. Failing, however, does not automatically imply remediation. If a yard fails the test and is above the safety level but not necessarily within the threshold for remediation, re-analysis will occur. Action levels are being set overall, not for individual homes.

Anthony Thomas suggested the EPA should test by lot and not yard. Most residential areas in Denver are comprised of two lots, and many residents use one lot as a garden

for example and another as a children's play area. Bonnie Lavelle responded that the EPA will test any area that is sub-dividable separately.

Lorraine Granado asked how action levels are set with regard to MRLs. Chris Weis explained that an MRL, or a reference dose is a dose measured by ug/kg/day. An MRL for arsenic would be calculated by measuring micrograms (ug) of arsenic per kilogram (kg) of body weight per day. An MRL coupled with exposure parameters yield an action level. Earlier in the project, emergency action levels were set for rapid clean up. The EPA is now setting a lower, longer-term exposure level, which will not be lower than the soil concentration calculated using the minimum risk level.

## **Community Issues**

### **"Health Team," ATSDR, EPA**

Community members have been meeting and having conference calls on a regular basis with ATSDR. A "health team" emerged from these meetings. The term "health team" was designated to these group meetings by David Mellard to identify what these meetings were for. The community feels these meetings are extremely helpful because ATSDR can discuss, explain, and clarify their many health issues. It is a way for the community to educate themselves. The EPA, however, was not recently invited to attend these meetings.

Lorraine Granado pointed out that the community felt a great amount of support from ATSDR, especially since a relationship between ATSDR and the community will continue past the clean-up of this site and will deal with issues of health and all other contamination involved. The community would like to continue the "health team" meetings with ATSDR, but has never wanted to exclude EPA from these meetings. In their view, the EPA is more than welcome to attend. Mel Munoz echoed Lorraine by saying that the community is meeting with ATSDR to share information. At the time these meetings started, the community was very concerned with garden issues and "is it safe to garden." No information discussed between the community and ATSDR has been kept from the Working Group. The "health team" had been informed that the EPA would not have time to attend any of these meetings, but they have always been open for anyone to attend and participate.

Susan Muza clarified that the community had many gardening questions. David Mellard and Jane Mitchell had several conference calls to discuss the technical evaluations for those questions, the database, and the data availability. On July 14, 1999, conclusions reached by David and Jane were presented to the health team and were brought to the Working Group the following day with supporting documents. On Monday, August 2, 1999, a discussion took place between ATSDR and the health team to explain the tables and the conclusions. Both the tables and the explanatory information are available.

Bonnie Lavelle answered that the EPA was never informed of these meetings. They would like to participate but want information about what the "health team" is considering. Technical, health and garden issues are all interconnected. Bonnie urged all agencies to work together, share ideas, and keep the overall process transparent, so that everyone in this process "is on the same page."

Chris Weis encouraged community members let him know if they had any questions about health via telephone, e-mail, or written correspondence and he will be happy to respond. Chris further explained that the EPA has worked with and continues to work with ATSDR on many sites where health studies are involved. All of these health studies evolved and improved because of direct and meaningful cooperation between the two agencies. Programs addressing human health and involving environmental data must be cooperatively designed.

The EPA made a commitment to the Working Group over a year ago to not take any action or initiate any work product without first verbally notifying the group, drafting objectives, and submitting written plans detailing how they will proceed. EPA encourages Working Group members, Federal, and regulatory agencies to consider the same commitment.

Sandy Douglas asked if ATSDR had written materials regarding gardening safety and, if so, to supply them to the Working Group.

Susan Muza said that ATSDR did have a Public Health Assessment Manual. It is not a regulatory document and is therefore fairly flexible. Susan also informed the Working Group that ATSDR is designing a flyer incorporating and explaining the conclusions and supporting tables for gardening. ATSDR hopes to have this flyer out in time for garden harvesting so comments should be made by August 13<sup>th</sup>, 1999.

ATSDR will next look at public health actions that may be appropriate and provide health interpretations as Phase Three sampling results return. The timing will be a joint process with the EPA. Discussion will begin now in preparation for when all of the data is quality assured.

### **Exposure Equations and Parameters for the Human Health Risk Assessment**

Notes on the presentation by Chris Weis:

## **Risk Assessment Process**

There are four steps involved in a risk assessment process:

- Hazard Identification
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization

Exposure assessment and toxicity assessment are distinct from one another, but together they make up the risk characterization which establishes the levels for consideration in clean-up decisions.

## **The Dose Makes the Poison**

In theory, even table salt and water can be poisonous. It all depends on the dose you receive. The dose makes the poison.

The exposure assessment estimates possible doses for your community. The toxicity assessment is based on the toxicity of the chemical. This is inherent in its chemical, structural and physical state. These aspects cannot be easily altered or manipulated for analysis purposes. Since the toxicity of an environmental toxin and contaminant cannot be changed, attempts are made to change the dose one can receive. All of the information Bonnie Lavelle receives is focused on changing the dose (exposure), which is what makes the poison.

## **Exposure Pathway Components**

The EPA studies all of the exposure pathway components resulting in risk assessment and, specifically, exposure assessment. For exposure, all five components: source, release mechanism, transport mechanism, exposure route, and receptor are required to complete a pathway. For example, if environmental contaminants are properly stored and there are no releases, the pathway is not complete.

EPA's risk management decisions about clean up, can address removing the receptor; evacuation, removing the source, (which is very difficult since certain contaminants we are dealing with at this site are naturally occurring), or treating the release and working on addressing the transport mechanism and exposure route. These last two areas are where the EPA can affect changes (i.e., the dose). The dose makes the poison and to effect the dose we need to understand the contaminant.

## **Reasonable Maximum Exposure (RME)**

The RME is the highest exposure that is reasonably expected to occur at a site. The intent of the RME is to estimate a conservative exposure that is still within the range of possible exposures. EPA regulations require that the Risk Assessment consider the RME. The EPA estimates dose through the risk assessment. The estimated dose is conservative but needs to be realistic. If the estimated dose is higher than EPA's acceptable doses, then risk management strategies must be put into place. Children and adults have different exposure estimates for varying reasons including body weight. Children's body weight is much lower than an adult's body weight; therefore, if a child eats one gram of a contaminant and an adult eats the same dose, the dose would be much higher for the child. Dose is measured by mg/kg/day.

Loraine Granado: Would exposure to some contaminants such as lead be more harmful to children than adults?

Chris Weis: In the case of lead, children *are* more sensitive to the toxic effects. However, this is not usually the case. It's important to remember, though, that children are often more highly *exposed* than adults because (1) their body weight is lower, (2) they tend to play in the dirt more often, and (3) they often put their fingers and toys in their mouths.

## **Exposures are Always Variable**

Exposures are always variable between groups and among individuals. From a regulatory perspective, to protect the public health, the EPA must assure that the most sensitive and most highly exposed are being protected. EPA's assumption is that by protecting the group most exposed (the children) and considering the toxicity, everyone else will be protected as well. It is important to remember that with any reasonable population estimate, there will always be risk. The question to answer is how much and where. It is also important to remember that the risk calculation is a probability. There can never be zero probability; therefore, there can never be zero risk.

## **Time Frames for Exposure to Toxic Substances**

As the duration of exposure moves from acute (short term) to chronic (longer term), the toxicity of most chemicals changes. ATSDR and other Working Group members were concerned that the sampling plan EPA had designed would not address acute exposure, only long-term exposure. Design changes were made to the sampling plan for Phase Three and then were tested using computer simulations. The result of those tests showed that for every condition tested, it was impossible to pass the test for long-term exposure (to yard average) and still fail the short-term test. All workgroup members



who attended the sampling design technical meeting agreed that the revised sampling was protective for both acute and chronic exposure.

## **Estimating Exposure to Soil Contaminants**

Notes on Chris' Equation:

C = soil and dust concentration. This is what the field lab is measuring. This value is plugged into the overall equation on a house by house basis.

IR = ingestion rate.

ABS = absorbed fraction (bioavailability). The fraction of an ingested dose that is absorbed into the blood.

EF = exposure frequency. This refers to how many times you are exposed over a period of time.

ED = exposure duration. This refers to how long you have been exposed (days, years etc.).

BW = body weight.

AT = averaging time. This refers to the time over which a particular poison will be looked at. For a cancer-causing chemical, a lifetime would be looked at. For acute poisons a shorter averaging time would be used.

The variables in this equation can be rearranged. By exchanging the "C" term with the dose value in this equation, an action level can be calculated.

Sandy Douglas: Is this equation used to determine the per property equation?

Chris Weis: Yes.

Joan Hooker: Are the results from this equation averaged?

Chris Weis: Yes, and the exposure variability will be presented. This is how the RME is derived.

## **Standard Exposure Factors**

Exposure frequency and exposure duration in this chart are default assumptions. They are however adjusted for communities.

Jane Mitchell suggested that a lower body weight for acute exposure be considered, such as a 2-3 year old range with a 10-kg body weight value.

Lorraine Granado preferred that the EPA conduct tests rather than modeling because of the unique situation (construction, trucks driving through etc.) at I-70/Vasquez Boulevard.

## **Bioavailability**

Immature swine will be used for the bioavailability study to be conducted by the EPA toxicologists. Immature swine are swine which have just been weaned, are not yet sexually mature and weigh approximately 10 – 12 kilograms. These immature swine most closely represent human children, who are the most sensitive receptors and for whom EPA is attempting to set standards for protection. Swine are also being used because their gastrointestinal systems are very closely related to the gastrointestinal systems of humans.

“Bioavailability is a measure of the fraction of material ingested which is absorbed into the blood.” Inhalation of materials can be examined in a bioavailability study as well. It is, however, customary to assume that the fraction that can be inhaled is completely absorbed by the body, and much of what is inhaled moves back up through the respiratory tract, into the throat and in the end, ingested.

Lorraine Granado: Will other contaminants such as thallium be examined in the bioavailability study?

Chris Weis: Currently there are no plans to include thallium in the bioavailability study. If thallium does turn out to be a contaminant of concern (COC), the EPA can determine whether to include thallium in a bioavailability study.

## **Absorption of Soil Lead by Immature Swine**

This study examines the dose response of feeding soil mixed with lead to swine. If a higher dose of lead or more lead is given to the swine, it will be more toxic. “The dose makes the poison.” The soil/lead mixture being fed to the swine mimics the range of what a human child might ingest.

Each dot on the graph represents 5 measurements in five different animals. Each animal is fed a 5 gram ball of sweetened food mixed with lead contaminated soil from the site. Each animal receives a varying dose twice a day throughout the course of the study. The toxicologists read the blood lead levels throughout the study in order to determine how much blood levels rise, or how much lead has been absorbed over a course of time by the swine. It is important to remember that each of the dots along the graph, throughout the course of time of the study, will represent amounts somewhat

lower than what the swine are initially fed. This is because only some lead is absorbed into the blood, while the rest is passed through the body's system.

### **Calculation: Relative Bioavailability**

In order to determine how much lead was absorbed by the swine, the area under the curves are measured. The more lead absorbed into the blood, the larger the area under the curve.

### **Arsenic Bioavailability in Pigs**

It is easier to measure a body's arsenic absorption than a body's lead absorption. Arsenic absorption can be measured by collecting urine. There is no need to take blood samples from the pigs. The pigs are kept in cages designed to separate urine from feces and collect urine only over a period of time.

### **Next Steps**

Working Group Meeting, September 2, 1999. 8:30 am – 1:00 pm, Swansea Recreation Center.

Next for EPA: Comparative Soil Study Finalization. Schedule meeting for comments.

Technical Meeting: August 17, 1999, 10:30 am at ISSI.

### **Wrap Up/Meeting Evaluation**

What are the implications of these studies?  
What needs to be done to stay healthy?

Very informative and helpful presentation.